

## General

### Title

Total knee replacement: percentage of patients undergoing a total knee replacement who had the prophylactic antibiotic completely infused prior to the inflation of the proximal tourniquet.

### Source(s)

American Association of Hip and Knee Surgeons. Total knee replacement performance measurement set. Rosemont (IL): American Association of Hip and Knee Surgeons; 2015. 29 p. [25 references]

## Measure Domain

### Primary Measure Domain

Clinical Quality Measures: Process

### Secondary Measure Domain

Does not apply to this measure

## Brief Abstract

### Description

This measure is used to assess the percentage of patients undergoing a total knee replacement who had the prophylactic antibiotic completely infused prior to the inflation of the proximal tourniquet.

### Rationale

The Surgical Care Improvement Project (SCIP) evaluates the timing and appropriateness of the prophylactic antibiotic. This measure evaluates that the prophylactic antibiotic is completely infused prior to the inflation of the tourniquet.

Antibiotic prophylaxis was evaluated by SooHoo et al. They evaluated the timing, the discontinuation, the appropriateness of the antibiotic and the proximal tourniquet inflation after infusion. Adherence to this indicator ranged from 24 to 27 percent at the 3 hospitals (SooHoo et al., 2011).

The following evidence statements are quoted verbatim from the referenced clinical guidelines:

If a proximal tourniquet is used, the antimicrobial should be completely infused before inflation (Bratzler & Houck, 2005).

## Evidence for Rationale

American Association of Hip and Knee Surgeons. Total knee replacement performance measurement set. Rosemont (IL): American Association of Hip and Knee Surgeons; 2013 Jan. 29 p. [25 references]

Bratzler DW, Houck PM, Surgical Infection Prevention Guideline Writers Workgroup. Antimicrobial prophylaxis for surgery: an advisory statement from the National Surgical Infection Prevention Project. *Am J Surg.* 2005 Apr;189(4):395-404. [PubMed](#)

SooHoo NF, Tang EY, Krenek L, Eagan M, McGlynn E. Variations in the quality of care delivered to patients undergoing total knee replacement at 3 affiliated hospitals. *Orthopedics.* 2011 May;34(5):e43-9.

## Primary Health Components

Total knee replacement; prophylactic antibiotic; proximal tourniquet inflation

## Denominator Description

All patients undergoing a total knee replacement (see the related "Denominator Inclusions/Exclusions" field)

## Numerator Description

Patients who had the prophylactic antibiotic completely infused prior to the inflation of the proximal tourniquet

## Evidence Supporting the Measure

### Type of Evidence Supporting the Criterion of Quality for the Measure

A formal consensus procedure, involving experts in relevant clinical, methodological, public health and organizational sciences

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

## Additional Information Supporting Need for the Measure

### *High Impact Topic Area*

During 1991 to 2010, the rate of primary total knee replacement procedures among the Medicare population increased over 161 percent from 93,230 procedures in 1991 to 243,802 procedures in 2010. The rate of revision procedures increased over 105 percent from 9,650 to 19,871 procedures. The majority of the primary total knee replacements were performed on women (approximately 65 percent) (Cram et al., 2012).

The Centers for Disease Control and Prevention (CDC) found that the overall total knee replacement rate increased 58% (from 5.5 to 8.7 per 1,000 population) between 2000 and 2006. Similar increases were

observed by sex, age group, and black or white race. Total knee replacement rates were 37 percent lower among blacks than whites (3.6 versus 5.7 per 1,000 population) in 2000, and 39% lower in 2006 (5.6 versus 9.2). In both years, the black/white disparity was lower among women (23% and 28%) than among men (63% and 60%). In 2006, blacks had a lower total knee replacement rate than whites in all 50 states and the District of Columbia (CDC, 2009).

In 2004 there were over 450,000 total knee replacements performed in the United States (American Academy of Orthopedic Surgeons [AAOS], 2008).

Between 2007 and 2009, over 22 percent of adults reported they had been diagnosed with arthritis (CDC, 2010). As the population ages, there will be an increased growth in the number of procedures. It is estimated that the number of total knee replacements performed per year could be over 3 million by the year 2030 (Kurtz et al., 2007).

#### Costs

Medicare paid approximately \$3.2 billion in 2000 for hip and knee joint replacements (Agency for Healthcare Research and Quality, 2003).

The overall inpatient costs for replacement of the knee during 2007 was over \$9.2 billion with hospital stays of more than 605,000 (Stranges, Russo, & Friedman, 2009).

## Evidence for Additional Information Supporting Need for the Measure

Agency for Healthcare Research and Quality. Total knee replacement: summary. Rockville (MD): Agency for Healthcare Research and Quality; 2003 Dec. 8 p. (Evidence report/technology assessment; no. 86). [100 references]

American Academy of Orthopaedic Surgeons (AAOS). The burden of musculoskeletal diseases in the United States. 2nd ed. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2008.

American Association of Hip and Knee Surgeons. Total knee replacement performance measurement set. Rosemont (IL): American Association of Hip and Knee Surgeons; 2013 Jan. 29 p. [25 references]

Centers for Disease Control and Prevention (CDC). Prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation --- United States, 2007-2009. MMWR Morb Mortal Wkly Rep. 2010 Oct 8;59(39):1261-5. [PubMed](#)

Centers for Disease Control and Prevention (CDC). Racial disparities in total knee replacement among Medicare enrollees--United States, 2000-2006. MMWR Morb Mortal Wkly Rep. 2009 Feb 20;58(6):133-8. [PubMed](#)

Cram P, Lu X, Kates SL, Singh JA, Li Y, Wolf BR. Total knee arthroplasty volume, utilization, and outcomes among Medicare beneficiaries, 1991-2010. JAMA. 2012 Sep 26;308(12):1227-36. [PubMed](#)

Kurtz S, Ong K, Lau E, Mowat F, Halpern M. Projections of primary and revision hip and knee arthroplasty in the United States from 2005 to 2030. J Bone Joint Surg Am. 2007 Apr;89(4):780-5. [PubMed](#)

Stranges E, Russo A, Friedman B. Procedures with the most rapidly increasing hospital costs, 2004-2007. Rockville (MD): Agency for Healthcare Research and Quality; 2009 Dec. 9 p. (H-CUP Statistical Brief; no. 82).

## Extent of Measure Testing

Unspecified

## State of Use of the Measure

### State of Use

Current routine use

### Current Use

not defined yet

## Application of the Measure in its Current Use

### Measurement Setting

Hospital Inpatient

Hospital Outpatient

### Professionals Involved in Delivery of Health Services

not defined yet

### Least Aggregated Level of Services Delivery Addressed

Individual Clinicians or Public Health Professionals

### Statement of Acceptable Minimum Sample Size

Does not apply to this measure

### Target Population Age

Unspecified

### Target Population Gender

Either male or female

## National Strategy for Quality Improvement in Health Care

### National Quality Strategy Aim

Better Care

## National Quality Strategy Priority

Making Care Safer

Making Quality Care More Affordable

Prevention and Treatment of Leading Causes of Mortality

## Institute of Medicine (IOM) National Health Care Quality Report Categories

### IOM Care Need

Getting Better

Living with Illness

### IOM Domain

Effectiveness

Efficiency

Safety

## Data Collection for the Measure

### Case Finding Period

Unspecified

### Denominator Sampling Frame

Patients associated with provider

### Denominator (Index) Event or Characteristic

Therapeutic Intervention

### Denominator Time Window

not defined yet

### Denominator Inclusions/Exclusions

Inclusions

All patients undergoing a total knee replacement

Note: Refer to the original measure documentation for Current Procedural Terminology (CPT) codes.

#### Exclusions

Documentation of medical reason for not completely infusing the prophylactic antibiotic prior to the inflation of the proximal tourniquet (e.g., a tourniquet was not used)

## Exclusions/Exceptions

not defined yet

## Numerator Inclusions/Exclusions

#### Inclusions

Patients who had the prophylactic antibiotic completely infused prior to the inflation of the proximal tourniquet

#### Exclusions

None

## Numerator Search Strategy

Fixed time period or point in time

## Data Source

Administrative clinical data

Electronic health/medical record

Paper medical record

Registry data

## Type of Health State

Does not apply to this measure

## Computation of the Measure

## Measure Specifies Disaggregation

Does not apply to this measure

## Scoring

Rate/Proportion

## Interpretation of Score

Desired value is a higher score

## Allowance for Patient or Population Factors

not defined yet

## Standard of Comparison

not defined yet

## Identifying Information

### Original Title

Measure #4: preoperative antibiotic infusion with proximal tourniquet.

### Measure Collection Name

Total Knee Replacement Performance Measurement Set

### Submitter

American Association of Hip and Knee Surgeons - Medical Specialty Society

### Developer

American Association of Hip and Knee Surgeons - Medical Specialty Society

### Funding Source(s)

Unspecified

## Composition of the Group that Developed the Measure

*Total Knee Replacement Work Group Members:* David Mauerhan, MD (Co-chair); Jay Lieberman, MD (Co-chair)

*American Association of Hip and Knee Surgeons:* Nelson SooHoo, MD

*American Academy of Orthopaedic Surgeons:* James Keeney, MD; Michael Parks, MD

*The Knee Society:* Jess Lonner, MD; Michael Mont, MD

*American Physical Therapy Association:* Sara Piva, PT, PhD

*Pacific Business Group on Health:* Kate Chenok, MBA

*American Medical Association (AMA)-convened Physician Consortium for Performance Improvement® (PCPI™):* Scott Endsley, MD; Samantha Tierney; Elvia Chavarria

*American Association of Hip and Knee Surgeons Staff:* Robert Hall; Krista Stewart

*Project Consultant:* Rebecca Kresowik

## Financial Disclosures/Other Potential Conflicts of Interest

None of the members of the Total Knee Replacement Work Group had any disqualifying material interests under the Physician Consortium for Performance Improvement (PCPI) Conflict of Interest Policy. The following is a summary of non-disqualifying interests disclosed on Work Group members' Material Interest Disclosure Statements. Completed Material Interest Disclosure Statements are available upon request.

Work Group Members	Disclosures
David Mauerhan, MD (Co-chair)	Payment for Consulting Services – Biomet, Inc.
Jay Lieberman, MD (Co-chair)	Payment for Consulting Services – De Puy, Inc.
Nelson SooHoo, MD	None
James Keeney, MD	Officer - Society of Military Orthopedic Surgeons and Mid-America Orthopaedic Association
Michael Parks, MD	Stock Ownership – Zimmer, Johnson and Johnson, Merck, Pfizer, P&G, United Health Payment for Consulting Services – Zimmer Holdings, Inc. Research Support – Zimmer Holdings, Inc. Director – American Academy of Orthopaedic Surgery, American Association of Hip and Knee Surgeons and New York State Society of Orthopaedic Surgeons
Jess Lonner, MD	Stock Ownership – Mako Surgical Research Support – Zimmer, Mako Surgical Speaking Honoraria – Zimmer, Mako Surgical Royalties – Zimmer Service on Speaker's Bureau – Zimmer, Mako Surgical Payment for Consulting Services – Zimmer Scientific Advisory Board – Healthpoint Capital, C D Diagnostics Service on Editorial Board for Several Peer Reviewed Journals
Michael Mont, MD	Research – NIH, Stryker, Tissue Gene, Wright Medical Royalties – Stryker Payment for Consulting Services – Stryker, Tissue Gene, Joint Active Systems, Johnson and Johnson, Salient Surgical
Scott Endsley, MD	None
Sara Piva, PT, PhD	None
Kate Chenok, MBA	None

## Measure Initiative(s)

Physician Quality Reporting System



## Adaptation

This measure was not adapted from another source.

## Date of Most Current Version in NQMC

2015 Jan

## Measure Maintenance

Unspecified

## Date of Next Anticipated Revision

Unspecified

## Measure Status

This is the current release of the measure.

The measure developer reaffirmed the currency of this measure in October 2015.

## Measure Availability

Source available from the [American Association of Hip and Knee Surgeons \(AAHKS\) Web site](#)

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For more information, contact AAHKS at 6300 N. River Road, Suite 615, Rosemont, IL 60018; Phone: 847-698-1200; Fax: 847-698-0704; Web site: [www.aahks.org](http://www.aahks.org) .

## NQMC Status

This NQMC summary was completed by ECRI Institute on May 29, 2014. The information was verified by the measure developer on July 21, 2014.

The information was reaffirmed by the measure developer on October 20, 2015.

## Copyright Statement

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## Production

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